Lean Way Of Valuing Inventory

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Research Title:

Subject: This study illustrates the actual cost calculations for inventory valuation for lean companies. The study will explain "the number of days method and unit quantity method" and highlight their differences between the traditional inventory valuation methods.

Abstract

American manufacturers which are choosing are lean principles as their basic business model, increasingly looking to lean thinking to improve productivity, reduce costs, enhance flexibility, create better value for their customers, and raise profits, cash flow, and stock price. The basic principles of lean thinking are based some solid factors namely profits are earned by selling products; value streams deliver customer satisfaction; nonfinancial operational data helps line workers manage business processes; real-time data is needed to enable process improvement; idle time is okay if there are no customer orders to fill at the moment; the goal of world-class organizations is to improve actual performance at a faster rate than competitors; front-line employees are an asset that should be cross-trained and highly skilled.

Moreover, the cardinal rule of lean management is eliminating all unnecessary steps that create waste. In this context, lean accounting seeks to reduce steps in transaction processing, eliminate standard costs in favor of actual costs, and discontinue cost allocations. The traditional mass production companies which are typically advocators of standard costing see inventory as the largest current asset on traditional manufacturer s balance sheet and naturally, a traditional manufacturer use their inventory asset for collateral for bank lines of credit. Thus, lot of cash is tied up in the inventory.

The traditional manufacturer inventory valuation is not based on an actual cost system. For instance, a company with inventory turns of 3.00 has four months of inventory on hand, which means it must use the actual production cost system for the last four months to value inventory. This absolutely obviates to maintain an actual cost system. On the other hand, lean companies aim to eliminate work in process and finished goods inventory with high inventory turns. A shrinking inventory value on a balance sheet based on real time cost information which in turn becomes a smaller percentage of total current assets is a typically way of doing for lean companies.

This study illustrates the actual cost calculations for inventory valuation. The study will explain "the number of days method and unit quantity method" and highlight their differences between the traditional inventory valuation methods.

Keywords: Lean Accounting, Inventory Valuation, Number of Days Method, Unit Quantity Method

1.LEAN PRODUCTION

Since the early 1980s, the market conditions faced with intensive global competition have led to many leading manufacturing companies to adopt new production approaches. Especially in the most prominent of these approaches is the concept of lean production. Lean manufacturing is a sophisticated approach that consists of quality systems, work teams, cellular manufacturing, and supply management and so on. It integrates many management applications. The core motivation behind the concept of lean production is working in synergy with these applications in a continuous manner through progressive and high quality systems according to customer demand but no or little waste at the end (Shah and Ward 2003, Kennedy and Widener 2008).

Product / service features generate income but if only if the customer value to them. If the added features do not add value in respect of the customer perspective, this will only create waste. This kind of waste is especially a pure waste which the management should be striving to prevent in order to gain a successful market share. The primary issue in developing product / service differentiation is using different customer preferences that add value not a bunch of waste (McNair 2007).

Fuji Cho (Toyota Manager) defines waste as follows: “anything other than the minimum amount of equipment, material, parts, space, and worker’s time which are absolutely essential to add value to the product” (Huntzinger 2007). According to Ohno'ya Taiichi "Toyota production system of the company lies on the basis of absolute waste prevention" (Grasso 2005). Prevention of waste provides significant improvements to the operation cost, productivity, quality and timely delivery of products improvements (Woehrle and Abou-Shady, 2010). Lean approach is not a striving effort for a zero waste and creating a perfect result. This approach is a never-ending journey of continuous improvement that seeks to create better and less wasteful results than previously known methods (Shah and Ward 2003). In other words, the lean production aims to decrease waste by increasing customer value (Carnes and Hedin 2005). Then, it would be possible for the stakeholders to share these earnings that lean creates (Grasso 2005).

Lean manufacturing aims to reduce labor force in the company, stock, defective products, the factory occupied area, cycle time, scrap and rework costs and, at the same time leads to increase productivity, quality and output. Such a restructuring, which would save time and factory space, would provide product quality monitoring and improvement. Stock at all levels may have a negative factor and thus, should be controlled (Carnes and Hedin 2005).

1.1.The Factors of Lean Production

If world-wide surveys conducted at the factory levels are considered, following applications under the framework of lean production are observed (Jusko 1999):

- Equipment set-up time efficiency
- Facilitating the production of small batches of equipment and work stations arranged in cellular production. A cell, which is in close proximity with another cell, thus, provides a quick feedback between the operators and includes all activities that are usually necessary for the production of a component or sub-components.
- Manufacturing cells often consist of cross-trained employees to perform multiple tasks.

- Just-in-time production / continuous production flow techniques are deployed to reduce batch sizes, reduce setup time, decrease severely the work-in process inventory levels, improve work / time ratio and reduce manufacturing cycle time. Just-in time generally use "pull" signals to initiate production facilities for actual orders instead of "push systems" at production plantings or work orders that are usually based on estimated levels
- Supplier deliveries in just-in time production systems, where more frequent deliveries in small lots of parts and materials are in consideration, should be scheduled to meet customer needs. Just-in time delivery made by suppliers usually reduces the inventory level of producers and thereby this both reduces the need for material requirement in the warehouse and inventory holding costs.

2.LEAN ACCOUNTING

Management accounting is an accounting discipline designated to provide managers the information for decision making that will optimize the organization in order to achieve its strategic, economic and profit objectives set by corporate management. If the strategy is correct for the market, this will ultimately increase the corporate value of the organization as a result of will result the increased value of the work, increased wages for workers and an increase in dividends to shareholders (White 2009).

In a study conducted by Advanced Manufacturing Consortium International (CAM-I) among 145 chief financial managers in the United States, it is expressed that:

- %80 of the managers still use traditional cost allocation systems and
- Only %23 of them declared that they are satisfied with their current decision support system (Sharman 2003).

These results should not be too surprising because the accounting community limited management accounting only with its contribution to the external financial reporting (White 2009). In addition, studies show that senior managers in the United States are lack of issues such as cost and resource management (Sharman 2003).

Lean Accounting movement was born as a solution to a period of intense disappointment. Lean American manufacturers, who are under pressure of this intense competition and want to overcome this great frustration, work continuously to ensure that the customer is willing to pay for the value created by permanently eliminating the waste (Grasso 2005).

Lean processes need information for value stream activities including purchasing, ordering and month-end closings. These processes value streams management need quick information to continuously determine waste, deploy employees for cost reduction activities in their divisions and analyze the results of improvement activities. Traditional accounting systems do not provide information about necessary measures and thus, they are late for creating value in a lean environment (Carnes and Hedin 2005).

In this concept, Lean Accounting has the following purposes (Maskell and Kennedy 2007).

- Motivating lean transformation all throughout the organization and providing accurate, timely and easily understandable information for decision-making process leading to increasing customer value, growth, profitability and cash flow
- Using lean techniques to remove waste from accounting processes while maintaining financial control

- Being fully complied with Generally Accepted Accounting Principles (GAAP), and with the requirements of external reporting and internal reporting arrangements,
- Investing in people, providing appropriate and relevant information to motivate and empower the organization at every stage of development to support the lean culture.

The main difference between traditional accounting and lean accounting is the fact that lean organizations are arranged according to value streams rather than the organization's functions. Value stream organizations simply need to re-organize their accounting knowledge in a simplistic manner (Haskin 2010). Lean organizations classify costs according to value streams rather than departments. The costs that may occur in value streams include design, engineering, sales and marketing, delivery costs as well as costs associated with customer relations, material purchasing and collection of receivables (Kroll 2004). From a management accounting point of view; any resources' total cost with the product material cost as well as the sum of the costs of outsourced services, are included to value stream cost object (Van Der Merwe and Thomson 2007).

In a lean environment, the processes are based on a customer oriented "pull" environment, where the production begins when the customer gives orders, rather than a "push" environment based on predictions. The products produced based on contemporary estimates will be produced in accordance with the budget and will be stored until delivered by the customer. Often, the problems may arise because of the high inventory levels and even the risk of stock being outdated. Traditional methods that assign fixed production costs, support high levels of production estimates to lower unit cost by assigning costs to greater number of units (Haskin 2010). Traditional accounting strives to assign cost to precise and fixed cost centers. On the other hand, lean accounting aims to accurately measure these costs rather than perfect assignment of them (Kroll 2004). Unlike traditional full cost accounting that assigns all overhead to product costs and supports excessive production, value stream organizations use simple and summarized direct costing that involves little cost assignment. As a result, lean accounting clearly contrasts with the traditional methods that claim it is efficient for overhead to be absorbed by mass production (Haskin 2010). It is a clear fact that conventional methods reflect an era dominated by the idea of economies of scale which has products with less variety. The information generated by the conventional methods may lead to wrong decisions (Drickhamer 2004).

This information is prepared weekly and it is easy to understand. Decisions are given by assessing their effects on value stream costs and profitability as a whole not assessing their effects on individual product. Thus, decisions may be made more effectively because the information is more accurate and understandable. Also, with this perspective, real information can be provided rather than information which is less accurate and sometimes based on complex accounting formulas (Maskell and Kennedy 2007).

3.LEAN INVENTORY VALUATION

Traditional manufacturers developed the standard cost systems which generate the standard unit costs for each product. In the balance sheet, the amount of inventory is the sum of multiplications of actual amount of each product with standard unit of that product. This process needs the periodic comparison of actual costs with the standards to update the standards to reach actual values. Using actual costs for inventory valuation is a requirement for GAAP. Using standard costs for inventory valuation needs the sustainability of a sophisticated system in order to observe and generate all necessary standard rates. Standard costing system assesses inventory at the level of individual product. This means that every inventory valuation needs detailed information about how an individual product's standard

cost is valued. The information about material invoices, work orders, work centers, overhead rates, direct labor rates, and direct / indirect assignments should be obtained, updated and be available for inventory valuation. On the other hand, lean companies have different perspectives for inventory valuation (Maskell and Kato 2007).

Lean companies can value their inventory in a very simple way because the most important feature of a lean company is its low level of inventory. When Inventory is low, many simple methods for inventory valuation may be considered. Physical inventory counting is quick and easy because inventory level is low and can be managed visually (Maskell and Kennedy 2007). The managers of lean companies know the inventory level that will enable continuous flow of all work cells in a value stream. All excess inventory is a waste and must be disposed. As a result, inventory at the end of the period was produced for that period, and thus, matching the actual production cost of inventory with its amount has become quite simple. Lean companies make actual cost calculations at inventory valuation in two ways. These two methods are described following (Maskell and Kato 2007).

a) Valuing Inventory Using the Unit Quantity Method

The average cost per unit method resembles traditional inventory valuation method in which the amount of each inventory component on hand is multiplied by actual material and conversion cost. The only difference is that the actual amount on hand is the sum of all units in the factory product range. Calculation is based on all inventory levels not on each individual item. The main assumption of this method is that the inventory is a mix of products that are sold and produced which is also a common assumption for lean pull systems. Figure1 exhibits the calculation of an inventory valuation based on average cost per unit method (Maskell and Kato 2007).

Total Units	**Total Material cost**	**Average Material Cost Per Unit**	**Total Conversion Cost**	**Average Conversion Cost Per Unit**
19.450	$758.568,33	$39,00	$779.155,56	$40,06
	Quantity	**Material Value**	**Conversion Value**	**Total Value**
Raw Material	13.730	$535.483	$0	$535.483
Work in process	2.288	$89.234	$91.656	$180.890
Finished Goods	3.432	$133.851	$137.484	$271.335
Total Inventory Value	19.450	$758.568,33	$229.139,83	$987.708,17

Figure 1: Valuing Inventory Using the Unity Quantity Method

b) Valuing Inventory Using the Number of Days Method

In the days of inventory method (Figure 2), daily material costs and conversion cost rates are used for inventory valuation. Daily rate information comes directly from value stream costing information and these daily rates are multiplied by the days on hand of each inventory component (Maskell and Kato 2007).

Days in the Month	**Total Material Cost**	**Material Cost per Day**	**Total Conversion Cost**	**Conversion Cost per Day**

20	$758.568,33	$37.928,33	$779.155,56	$38.957,78

	Days	**Material Value**	**Conversion Value**	**Total Value**
Raw Material	12	$455.140	$0	$455.140
Work in process	2	$75.857	$77.916	$153.772
Finished Goods	3	$113.785	$116.873	$230.658
Total Inventory Value	17	$644.781,67	$194.788,89	$839.570,56

Figure 2: Valuing Inventory Using the Number of Days Method

4.CONCLUSION

Conventional methods reflect an era dominated by the idea of economies of scale which has products with less variety. The information generated by the conventional methods such as standard costing may lead to wrong decisions. In addition, the maintenance and use of a standard costing system requires a sophisticated and costly process which absolutely contrasts with the principles of a lean organization.

Lean organizations use value stream costing that is simple and based real time information for their purpose of cost control, internal decision making and external financial reporting. The lean inventory valuation methods for these purposes (the number of days method and unit quantity method) as illustrated in this study are compliant with GAAP. Regarding these methods, there is no need to know the cost of any specific product and maintain a sophisticated standard cost system. The simplification of inventory valuation process means eliminating non-value added activities and creating available capacity for finance people to focus on lean improvement projects.

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